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TITLE: Spectral based color image
editing
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INVENTOR-INFORMATION:

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ABSTRACT:

A color image editing system and method uses sensor responses in an image capture device to estimate and separate illuminant and surface reflectance in a scene. The system uses the estimated surface reflectances, along with a desired illuminant SPD, to calculate the corresponding XYZ values. To render the images on an imaging device, the XYZ values are converted into device-dependent display or printer values. The image data may be manipulated in a manner that is intuitive to humans, such as correcting the image data

according to changes in lighting and surface color.

An image capture device, such as a scanner or digital camera, represents a scene as image data that is resolved as device-dependent channels, such as RGB. For each channel, the spectral reflectances of the surfaces within the scene are described reflectance functions that are independent of the lighting function that describes the illuminant spectral power distribution (SPD). Display operators can independently adjust the surface and lighting functions.

9 Claims, 8 Drawing figures

Exemplary Claim Number: 1

Number of Drawing Sheets: 8

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Detailed Description Text - DETX (12):

In step 140, a matrix A is created by inverting the matrix C. In step 150, an image of the scene is captured and stored as a 3.times.p matrix of sensor pixel values, R. In step 160, a n.times.p scene matrix, S, that describes the spectral reflectance of all points sampled, is constructed by multiplying 3 matrices: B, a n.times.3 matrix representing the 3 spectral basis functions for surface reflectances, the inverted scene transfer matrix A, and the sensor pixel value matrix R. In this step, the system operator may change the spectral representations of surfaces in the scene, S, such

as changes in the **skin** tone
of a person, the color of a dress, the saturation
of grass, or the color of
drapes.